

## CLAIMS

What is claimed is:

1. A method for plotting a graph using a markup language, comprising the steps of:  
1  
2 receiving first graph information as a markup language document in response to a  
3 request for a graphic display and upon retrieval of the first graph information  
4 from a data source according to the request, wherein the markup language  
5 document is associated with a document type definition, and  
6 plotting the first graphic display on a display device according to the markup  
7 language document and associated document type definition.
- 1 2. The method of claim 1 wherein the step of receiving first graph information is  
3 performed such that a request for a second graphic display initiated through  
4 interaction with the first graphic display does not require retrieving again the first  
graph information from the data source.
- 1 3. The method of claim 2 wherein the second graphic display is an incremental  
2 elaboration of the first graphic display;  
3 wherein the step of plotting the first graphic display is such that subsequently plotting  
4 the second graphic display does not require plotting again the first graphic  
5 display.
- 1 4. The method of claim 1 wherein the first graph information as the markup language  
2 document includes  
3 image information for specifying a graphical image representing a focus entity for  
4 plotting in the first graphic display,  
5 label information for specifying a label associated with the graphical image for  
6 plotting in the first graphic display,

7 connection information for specifying one or more connections between the graphical  
8 image and one or more secondary graphical images; and  
9 wherein the step of plotting the first graphic display is performed based on the image  
10 information, the label information, and the connection information.

- 1 5. The method of claim 4 wherein the step of plotting the first graphic display is  
2 performed according to a display arrangement in which the graphical image is  
3 substantially centered on the display device with the one or more secondary graphical  
4 images connected to the graphical image in a generally circular pattern.
- 1 6. The method of claim 4 wherein the first graph information as the markup language  
2 document further includes one or more of:  
3 tool tip information for specifying information to display on the display device upon a  
4 first interaction with the graphical image,  
5 click action information for specifying an action to perform upon a second interaction  
6 with the graphical image,  
7 menu information for specifying a menu to display on the display device upon a third  
8 interaction with the graphical image; and  
9 wherein the step of receiving the first graph information is according to the markup  
10 language document.
- 1 7. The method of claim 4 wherein the first graph information as the markup language  
2 document further includes  
3 menu information for specifying a menu to display on the display device upon a first  
4 interaction with the one or more connections; and  
5 wherein the step of receiving the first graph information is according to the markup  
6 language document.

- 1    8. The method of claim 1 wherein the step of plotting the first graphic display is  
2        performed according to one specified display arrangement from a plurality of  
3        available display arrangements.
- 1    9. A method for displaying a network topology //comprising the steps of: //  
2        receiving a markup language document associated with a document type definition //  
3        the document including  
4              graph information specifying display attributes for plotting the network  
5              topology; //  
6        network node information, the node information including  
7              image information for specifying a graphical image representing a first  
8              node for display on a display device, //  
9              node label information for specifying a node label associated with the  
10          graphical image for display on the display device, //  
11          network node connection information specifying a connection between  
12          graphical images and representing a network link between the first  
13          node and a second node;  
14          displaying on the display device the graphical image and the node label for the first  
15          node, according to the node information and the graph information; and  
16          displaying on the display device the connection between the graphical image  
17          representing the first node and at least a second graphical image representing  
18          the second node, according to the node connection information and the graph  
19          information.
- 1    10. The method of claim 9 wherein the network node information further includes one or  
2        more of the following:

3 tool tip information for specifying information to display on the display device upon a  
4 first interaction with the graphical image,  
5 click action information for specifying an action to perform upon a second interaction  
6 with the graphical image,  
7 menu information for specifying a menu to display on the display device upon a third  
8 interaction with the graphical image; and  
9 the method further comprises the step of:  
10 enabling functions initiated by each of the first interaction, the second interaction, and  
11 the third interaction.

11. The method of claim 10 wherein the function initiated by the third interaction  
1 includes retrieving a file for displaying information about one or more network links  
2 between the first node and one or more nodes connected to the first node.  
12. The method of claim 10 wherein the function initiated by the third interaction  
2 includes retrieving a file for displaying information about one or more routers  
3 associated with the first node.  
13. The method of claim 10 wherein the function initiated by the third interaction  
2 includes retrieving a file for displaying information about one or more subnetworks  
3 associated with the first node.  
14. The method of claim 9 wherein the steps of displaying the graphical image and the  
2 node label and displaying the connection are performed according to one specified  
3 display arrangement from a plurality of available display arrangements.  
15. The method of claim 9 wherein the steps of displaying the graphical image and the  
2 node label and displaying the connection are performed such that the graphical image  
3 is substantially centered on the display element of the display device.

- 1    16. The method of claim 9 wherein the step of displaying the graphical image and the  
2       node label is performed such that graphical image size is related to the number of  
3       connections to the graphical image. //
- 1    17. The method of claim 9 wherein the network node connection information includes  
2       connection label information for specifying a label associated with the connection and  
3       wherein the step of displaying the connection includes displaying the connection  
4       label.
- 1    18. The method of claim 17 wherein the connection label information includes a cost  
2       parameter label that reflects the bandwidth capacity of the network link represented  
3       by the connection. //
- 1    19. The method of claim 9 wherein the connection information includes  
2       menu information for specifying a menu to display on the display device upon an  
3       interaction with the connection; and  
4       the method further comprises the step of:  
5       enabling a function initiated by the interaction.
- 1    20. A computer-readable medium carrying one or more sequences of instructions for  
2       plotting a graph using a markup language, wherein execution of the one or more  
3       sequences of instructions by one or more processors causes the one or more  
4       processors to perform steps of:  
5       receiving first graph information as a markup language document in response to a  
6       request for a graphic display and upon retrieval of the first graph information  
7       from a data source according to the request, wherein the markup language  
8       document is associated with a document type definition; and

- 9 plotting the first graphic display on a display device according to the markup  
10 language document and associated document type definition.
- 1 21. The computer-readable medium of claim 20 wherein the first graph information as the  
2 markup language document includes  
3 image information for specifying a graphical image representing a focus entity  
4 for plotting in the first graphic display,  
5 label information for specifying a label associated with the graphical image  
6 for plotting in the first graphic display,  
7 connection information for specifying one or more connections between the  
8 graphical image and one or more secondary graphical images; and  
9 wherein execution of the one or more sequences of instructions by one or more  
10 processors causes the one or more processors to perform the step of plotting  
11 the first graphic display based on the image information, the label  
12 information, and the connection information.
- 1 22. A computer-readable medium carrying one or more sequences of instructions for  
2 displaying a network topology, wherein execution of the one or more sequences of  
3 instructions by one or more processors causes the one or more processors to perform  
4 steps of:  
5 receiving a markup language document associated with a document type definition,  
6 the document including  
7 graph information specifying display attributes for plotting the network  
8 topology;  
9 network node information, the node information including  
10 image information for specifying an graphical image representing a  
11 first node for display on a display device,

node label information for specifying a node label associated with the graphical image for display on the display device, network node connection information specifying a connection between graphical images and associated with a network link between the first node and a second node; displaying on the display device the graphical image and the node label for the first node, according to the node information and the graph information; and displaying on the display device the connection between the graphical image representing the first node and at least a second graphical image representing the second node, according to the node connection information and the graph information.

23. The computer-readable medium of claim 22 wherein the network node connection information includes connection label information for specifying a label associated with the connection and wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the step of displaying the connection including displaying a label representing a cost parameter that reflects the bandwidth capacity of the network link associated with the connection.

24. A computer system comprising:

  - a network interface;
  - a memory; and
  - one or more processors connected to the network interface, the one or more processors configured for
  - receiving first graph information as a markup language document in response to a request for a graphic display and upon retrieval of the first graph

8                   information from a data source according to the request, wherein the  
9                   markup language document is associated with a document type  
10                  definition; and  
11                  plotting the first graphic display on a display device according to the markup  
12                  language document and associated document type definition.

- 1   25. An apparatus for displaying a network topology, the apparatus comprising:  
2       means for receiving a markup language document associated with a document type  
3                  definition, the document including  
4                  graph information specifying display attributes for plotting the network  
5                  topology;  
6       network node information, the node information including  
7                  image information for specifying a graphical image representing a  
8                  first node for display on a display device,  
9                  node label information for specifying a node label associated with the  
10                 graphical image for display on the display device,  
11       network node connection information specifying a connection between  
12                 graphical images and associated with a network link between the first  
13                 node and a second node;  
14       means for displaying on the display device the graphical image and the node label for  
15                 the first node, according to the node information and the graph information;  
16                 and  
17       means for displaying on the display device the connection between the graphical  
18                 image representing the first node and at least a second graphical image  
19                 representing the second node, according to the node connection information  
20                 and the graph information.

- 1 26. A method for plotting a graph using a markup language, comprising the steps of:  
2 receiving a request for a graphic display;  
3 retrieving first graph information from a data source according to the request;  
4 generating a markup language document including the first graph information; and  
5 transmitting the markup language document to a graphic application for plotting the  
6 first graphic display on a display device according to the markup language  
7 document and an associated document type definition.
- 1 27. The method of claim 26 wherein the step of retrieving first graph information is  
2 performed such that a request for a second graphic display initiated through  
3 interaction with the first graphic display does not require retrieving again the first  
4 graph information from the data source.
- 1 28. The method of claim 26 wherein the markup language document includes:  
2 image information for specifying a graphical image representing a focus entity for  
3 plotting in the first graphic display,  
4 label information for specifying a label associated with the graphical image for  
5 plotting in the first graphic display,  
6 connection information for specifying one or more connections between the graphical  
7 image and one or more secondary graphical images; and  
8 wherein the step of plotting the first graphic display is performed based on the image  
9 information, the label information, and the connection information. —
- 1 29. The method of claim 28 wherein the markup language document further includes one  
2 or more of:  
3 tool tip information for specifying information to display on the display device upon a  
4 first interaction with the graphical image,

5 click action information for specifying an action to perform upon a second interaction  
6 with the graphical image,  
7 menu information for specifying a menu to display on the display device upon a third  
8 interaction with the graphical image; and  
9 wherein the step of receiving the first graph information is according to the markup  
10 language document.

1 30. The method of claim 28 wherein the first graph information as the markup language  
2 document further includes  
3 menu information for specifying a menu to display on the display device upon a first  
4 interaction with the one or more connections; and  
5 wherein the step of receiving the first graph information is according to the markup  
6 language document.

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